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ENTOMOLOGY.<sup>1</sup>

AN EPIDEMIC DISEASE OF *Caloptenus differentialis*.<sup>2</sup>—On Aug. 26th of the present year I noticed numbers of this common locust hanging to the upper portions of various weeds in the attitude of life, but with their bodies falling to pieces and appearing in some cases as if they had been eaten into by birds.

A hasty examination of the bodies showed that the soft parts were entirely destroyed, but the body more or less filled with a pulverulent clay-colored mass. Suspecting some parasitic disease, I collected a number of specimens, and the following day made a microscopic examination of the body contents. This showed the substance to be composed of minute spherical bodies massed together in immense numbers, which were evidently one stage of some parasitic plant, and, as such, specimens were referred to Professor Bessey, who pronounced them *Entomophthora* of a species hitherto unknown. He has kindly described the species under the name *Entomophthora calopteni*, and his description will appear in this number of the *NATURALIST*.

Subsequent observation showed the epidemic to be quite widespread in this locality, but especially prevalent in the low land adjoining a creek which runs about a mile east of the college.

Two or three weeks after first noticing them I could find scarcely a living specimen of this species of locust in that locality, though in the college garden they were still plenty, and most of them apparently quite healthy.

Although the species of locust named is the one which seems particularly affected, I have found *Caloptenus femur-rubrum* evidently attacked by the same disease, but no microscopic examination of the body contents was made.

The early stages of the disease have not been noted with certainty as yet, and so far as I can judge they are not marked unless it be by a sluggishness of the insect. The locusts seem invariably to climb to the upper portion of some tall weed or stem of grass. They fix themselves firmly by legs and claws to the plant so that they remain after death until broken to pieces, when they fall away part by part.

In some specimens noted, which were apparently but recently dead, the body contained a blackish fluid substance, but this must very quickly be replaced, if it always occurs, by the mealy mass. This mass, however, remains moist for some days, but finally, if kept in a dry place, becomes entirely hard, the oöspores retaining their globular form and original size unaltered.

Our knowledge of this parasite is still too meager to draw any positive conclusions concerning its economic value, or to say whether it can be controlled and used against such destructive

<sup>1</sup> This department is edited by PROF. C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., should be sent.

<sup>2</sup> Read before the Iowa Academy of Science, Sept. 27, 1883.

insects as the different species of locust; points which will be of special interest in case of another invasion of the Rocky Mountain locust, though certain species of our native locusts are probably no less important economically if their abundance and constant work be taken into consideration.

The oöspores could easily be distributed in localities where the disease occurs, and thus the disease could doubtless be introduced in localities not previously infected, and once introduced it would, like other epidemic diseases, under proper conditions propagate itself. Further study is necessary to establish these points and to determine what methods, if any, are to be adopted for the cultivation of the disease.—*Herbert Osborn, Agricultural College, Ames, Iowa.*

[We strongly suspect that the *Entomophthora* is a result rather than a cause of disease and debility in this case. The death of species of *Calopteni*, as of other *Orthoptera*, in the positions and with all the conditions mentioned by Professor Osborn, is of not infrequent occurrence in the Mississippi valley. We have often witnessed it, and have briefly referred to it in the 7th Mo. Entomological report, p. 180. Our experience has been, however, that the insects ascend the plants to die, after having been brought to the point of death by either *Sarcophaga* or *Tachina* larvæ, chiefly the former. At the time the maggots leave the locust the body of this last contains chiefly the decomposing "blackish fluid" alluded to, and this doubtless offers an inviting nidus to the spores of the *Entomophthora*. The general appearance of the pulverulent mass of spores is very similar to that of *Massospora cicadina* Peck, affecting *Cicada* when debilitated (31st Rep. N. Y. St. Mus. Nat. Hist., p. 44, 1879).—*C. V. R.*]

**OCCURRENCE OF A STRATIOMYS LARVA IN SEA-WATER.**—I send herewith rough sketches of a salt-water grub found by me on the 28th of July, beneath a bundle of sea-wrack or *Zostera*—popularly known as eel-grass—on the sea-beach at the north end of Plum island, near the mouth of the Merrimac river. I never saw a grub that could stand the washings of the sea before, and I was surprised by its habitat as well as its size. I picked up the eel-grass and the grub, and kept it in a box alive for three days, when a child got the box and I lost the prize. I believe it had attained its growth, and I regretted that its transformations could not be witnessed. Fortunately, fearing lest the grub might disappoint me, I measured and sketched the maggot, which was black and white. The head was not larger than the end of a cambric needle.—*A. W. Pearson, Norwich, Conn.*

[The sketch is evidently that of the larva of a species of *Stratiomys*, a fly typical of the dipterous family *Stratiomyidæ*. This is the first time the larva has occurred in sea-water, so far as we are aware. Similar larvæ have occurred in a hot spring in Colorado (*AMERICAN NATURALIST*, XVI, p. 599), also in Borax lake,

California (*American Journal of Science*, Feb., 1871, p. 102).—*A. S. P.*]

SOME RECENT DISCOVERIES IN REFERENCE TO PHYLLOXERA.<sup>1</sup>—Every new fact in the life-history of the insects of this genus has an exceptional interest because of its bearing on the destructive grape-vine Phylloxera. The genus is most largely represented in this country by a number of gall-making species on our different hickories, and the full annual life-cycle of none of them has hitherto been traced. The galls are produced, for the most part, in early spring; the winged females issue therefrom in early summer; and thenceforth, for the remainder of the year, the whereabouts of the insect has been a mystery. The author has for several years endeavored to solve the mystery, and at last the stem-mother (the founder of the gall), the winged agamic females (issue of the stem-mother), the eggs (of two sizes) from these winged females, the sexed individuals from these eggs, and the single impregnated egg from the true female, have been traced in several species. There is some evidence, though not yet absolutely conclusive, that this impregnated egg hatches exceptionally the same season; also, of a summer, root-inhabiting life. In *Phylloxera spinosa*, which forms a large roseate somewhat spinose gall on *Carya alba*, and which has been most closely studied, the impregnated egg is laid in all sorts of crevices upon the twigs and bark and in the old galls, in which last case they fall to the ground.

Up to this time they have remained unhatched, and will in all probability not hatch till next spring, thus corresponding to the "winter egg" of the grape Phylloxera.

COLEOPTERA INFESTING PRICKLY ASH.—In his "Notes on Insects bred from Prickly Ash" (*Trans. Amer. Ent. Soc.*, II, p. VIII), Dr. Shimer states that "among the Coleoptera obtained by beating the prickly ash bushes, I observe numerous specimens of a small gray snout-beetle, an undescribed species of *Centrinus*." The species referred to is undoubtedly *Zygobaris conspersa*, described by Dr. Le Conte in the *Rhynchophora* of N. A., p. 318, and the seven typical specimens were in all probability given to Dr. Le Conte by Shimer, and not, as stated (*l. c.*), by Walsh. *Z. conspersa* is, in my experience, peculiar to *Xanthoxylon*, but by no means occurs wherever this tree occurs. I have thus far failed to find the earlier states of the species, but I have no doubt that the small elongated scars occasionally to be seen on the smaller branches and which resemble those so frequently caused by *Ampelogypter* on *Ampelopsis*, are the work of the *Zygobaris*.

Of the other species mentioned by Shimer in connection with prickly ash, only *Micracis suturalis* seems to be confined to that tree. His *Liopus xanthoxyli* bores in dead and dying wood of all

<sup>1</sup> Abstract of a paper by C. V. Riley, read before the A. A. A. S. at Minneapolis.

sorts of deciduous trees, and the two other species, *Læmophlæus adustus* and *Sacium fasciatum*, are also not confined to *Xanthoxylum*.

The worst enemies of the tree are *Trirhabda tomentosa* and the larva of *Papilio cresphontes* which, usually working in company, not unfrequently defoliate large groves.—*E. A. Schwarz*.

THE GROWTH OF INSECT EGGS.—Dr. J. A. Osborne, of Milford, Eng., has an interesting article (Hardwicke's *Science Gossip*, Oct., 1883, p. 225) on growth in the eggs of insects. He attributes it solely to moisture. The most remarkable instance we know of is that of the eggs of our katydids, especially of *Phaneroptera curvicauda* (see 6th Mo. Ent. Rep., p. 165). Here the egg remains so flat between the cuticles of the edge of a dried leaf that it produces no swelling; yet before hatching it becomes cylindrical, even where the dry leaf is sheltered from dews and rains. Egg growth is usually great in proportion as the shell is delicate, and can generally be explained by endosmosis of moisture surrounding it; but here the shell is tough and can get no moisture beyond what is in the atmosphere, and there would seem to be an inherent swelling power consecutive with embryological development.—*C. V. R.*

PROTECTIVE DEVICE EMPLOYED BY A GLAUCOPID CATERPILLAR.—It is well known that many caterpillars, *e. g.*, those of the *Arctiidae*, interweave their prickly hairs with their cocoons, thus not only rendering the latter stronger and thicker, but also furnishing a kind of protection in those species in which the hairs have an urticating power. A quite novel and very ingenious method of utilizing its hair for the protection of the chrysalis is that employed by the larva of *Eunomia eagrus*, as described and figured by Dr. Fritz Müller, in *Kosmos*, Vol. vi, p. 449. Around the slender twig to which it intends to fasten its chrysalis, the larva constructs from its hairs, before and behind itself, a series of whorls, about six in number, the hairs in each whorl being vertically and very densely fastened to the twig. The inside whorls are so fastened that they incline over the head and tail ends of the pupa. Between these two formidable rows of palisades the pupa rests safe from the attacks of any small and unwinged enemy.

SAW-FLY LARVÆ ON THE QUINCE.—Mr. J. A. Lintner, in the *Country Gentleman*, October 4, 1883, describes a slug-worm found by a correspondent injuring the leaves of his quince trees, and calls for identification of the same. There cannot be much doubt that the species is the common *Selandria (Eriocampa) cerasi* of Peck, well known to occur on apple, pear and cherry. Almost all insects that attack the pear will also attack the quince.

ENTOMOLOGY IN NEW YORK.—Mr. Lintner has favored us with an advance copy of his first report (for the year 1881) as State

entomologist of New York,<sup>1</sup> and we have had much pleasure in its perusal. It is one of the best entomological reports published in this country. There is much to commend, not only in the matter itself and the great care with which every opinion given has been considered, but also in the scarcely less important details of arrangement of material; in the completeness of the index and table of contents; in the excellent little bibliographical lists accompanying the consideration of each species, and in many other minor points.

The report opens with a forcible plea for entomological study, and this is followed by a summary of the progress made in economic entomology in the last twenty years, embracing a short account of the personal work of each of the leading entomologists, and reference to the chief entomographic collections. Fifty pages are then devoted to a consideration of the most prominent remedies and preventives against injurious species. This part of the work is in the nature of compilation, with little that is based on the author's experience or experiment, but it is admirably done, and will prove most useful to those for whom it is more particularly intended. After a few pages on classification, the consideration of specific insects begins.

The injurious insects treated of comprise, in the main, those species which have lately been prominent in the State of New York. They are grouped into their respective orders, and are as follows:

LEPIDOPTERA. — *Thyridopteryx ephemeraeformis*, *Tolyte laricis*, *Nephelodes violans*, *Gortyna nitela*, *Heliothis armiger*, *Crambus vulgivagellus*, *Cr. exsiccatas*, *Anarsia lineatella*, *Bucculatrix pomifoliella*, and *Coleophora malivorella*.

DIPTERA. — *Phorbia ceparum*, *Ph. cilicrura*, *Anthomyia brassicae*, *A. radicum*, *A. raphani*, *A. zea*, *A. similis*, *Hylemyia deceptiva*, *Mallota posticata*, *Drosophila ampelophila*, *Meromyza americana*.

COLEOPTERA. — *Macrodactylus subspinosus*, *Crioceris asparagi*, *Phytonomus punctatus*, *Sphenophorus sculpitilis*.

HEMIPTERA. — *Murgantia histrionica*, *Pezilocapsus lineatus*, *Enchenopa binotata*.

These articles contain much original and valuable matter, while previous writings are used with discrimination and full credit.

The report closes with four appendices. Appendix A gives a digest list of the entomological papers of Dr. Fitch and an account of his entomological works, chiefly in connection with the State. Appendix B includes a list of 176 insects injurious to the apple tree. C contains reprinted descriptions of *Nisoniades nævius*, n. sp., *N. petronius*, n. sp., *N. somnus*, n. sp., *Eudamus electra*, n. sp.; notes upon *N. proprius*, *N. icelus*, *Eu. proteus* and *Eu nevada*, and also a short paper on the Life Duration of the Heterocera. D, miscellaneous addenda. A and B are most full and praiseworthy; C, while valuable, is not so germane, being already accessible to entomologists, for whom alone it has interest.

<sup>1</sup> First annual report on the Injurious and other Insects of the State of New York. By J. A. Lintner, State entomologist. Albany, 1882. (Issued Oct., 1883.)

Altogether the report shows such care, ability and conscientiousness, that the people of New York are to be congratulated on having so worthy a successor to Fitch.

The illustrations are from various sources, and for the most part duly credited; a few are original. The press-work and paper, while by no means first-class, are rather above the average for State documents.

FRUIT INSECTS IN CALIFORNIA.—In "Injurious Insects of the Orchard, Vineyard, etc." Mr. Matthew Cooke has given Californians a very serviceable little book.<sup>1</sup> Between two and three hundred species of injurious insects are considered, and, although the work is in part a compilation, many of the author's own observations in the matter of remedies are given. By means of an extensive correspondence with entomologists at the East, Mr. Cooke has reduced scientific errors to a minimum. The work is very copiously illustrated, containing 750 wood-cuts. As an economy of space the remedies—124 in all—are grouped at the end of the work, and referred to by number at the close of the consideration of each species. The book is another evidence of the newly-awakened interest in economic entomology on the Pacific slope. With the push and energy which characterize Californians, Mr. Cooke, seeing the need of such a work, has thrown it together in an amazingly short time, and disarms all serious criticism by disclaiming in the preface any pretension to science, and by showing that he was led to the study of insects by his business of manufacturing fruit-boxes.

DEATH OF DR. J. L. LeCONTE.—Just as we go to press we learn with profound sorrow of the death of this distinguished coleopterist. The loss of no other individual could be felt more keenly by the entomologists of America. As a writer he had won the esteem of all, and his family has our sincerest sympathy.

ENTOMOLOGICAL NOTES.—Dr. Hagen publishes in connection with his "Beiträge zur Monographie der Psociden" (Stett. Ent. Zeit., 1883, 285–332), an interesting review of the history of the "death-watch."—W. F. Kirby, of the British Museum, hitherto well known for his work in lepidopterology, has begun the study of the Hymenoptera, and will doubtless prove a worthy follower of the late Frederick Smith.—It is stated by E. H. Miller, in the *American Agriculturist*, that *Macroductylus subspinosus* prefers the flowers of *Deutzia scabra* to the grape vine.—Dr. Hermann Müller, whose death was announced last month, had, by his painstaking studies of insects in their relations to flowers, achieved

<sup>1</sup> Injurious Insects of the Orchard, Vineyard, Field, Garden, Conservatory, Household, Storehouse, Domestic Animals, etc., with remedies for extermination. By Matthew Cooke, late chief executive horticultural officer of California. Sacramento (1883).

preëminence in this inviting field of research. He wrote much for some of the leading natural history periodicals, and his two chief works are "Die Befruchtung der Blumen durch Insecten" and "Alpenblumen; ihre Befruchtung durch Insecten."—At the meeting of the Academy of Science of Paris, September 17, M. J. Chatain gave a description of the olfactory organs which are found on the antennæ of *Vanessa io*.—The imports of raw silk at the ports of New York and San Francisco for the month of October, 1883, reached 2783 bales = \$1,726,741. The imports of waste silk and pierced cocoons at same ports, amounted to 50 pkgs. = \$14,282.

ECONOMIC NOTES.—It seems that the Treaty of Berne, to which most of the European countries have assented and which prescribes certain regulations as to the transit of plants with a view of preventing the introduction of the grape Phylloxera, has worked satisfactorily, though Holland, Spain and Italy, which were not represented in the treaty, yet find great annoyance from the Phylloxera laws existing on the continent. It is stated in a recent number of the *Gardeners' Chronicle* that thousands of plant packages are lying on the German frontier awaiting instructions.—Mr. A. J. Caywood, of Marlboro, N. Y., informs us that dry lime liberally and rapidly thrown over the foliage after rain has, in his experience this season, proved effectual against rose-bugs, which came in swarms. It costs fifteen to twenty cents per bushel at the kiln.—The Le Brun prize of 500 fr. and a gold medal, awarded by the Academy of Belles Lettres, Science and Arts of Lyons, every three years, for the most valuable improvement relating to the silk industry, was this year awarded to an American, Edward W. Sewell, Jr., for his automatic silk reel.

## ZOOLOGY.

A NEW VIRGULARIAN ACTINOZOON.<sup>1</sup>—*Radicipe pleurocristatus*, both genus and species, is based upon a peculiar Japanese form, and is described by Mr. Stearns in the Proc. U. S. Nat. Museum, July 27, 1883.<sup>2</sup> It differs from other Virgularians in the arrangement of the polyps, which occur in a single series along one edge of the obtusely quadrangular style, and in the termination of the basal end, which instead of being simple or falciform, as in the species heretofore described, is furcate and root-shaped, pointing to a relationship, and connecting the simple-stalked Virgularians with the sea-fans or Gorgonacea.

The paper also treats of the structure and habits of related forms, and gives a new habitat, the codfishing banks of the Shu-

<sup>1</sup> Description of a new genus and species of Alcyonoid polyp from Japanese waters, with remarks on the structure and habits of related forms, etc., by Robert E. C. Stearns, pp. 96-101.

<sup>2</sup> Also read at the Montreal meeting of the Am. Assoc. Adv. Science, Aug., 1882.